

# Chu visits MIT, gives talk on clean energy

## Encourages students to get involved

By Leo Zhou  
ASSOCIATE NEWS EDITOR

U.S. Secretary of Energy and Nobel Laureate in Physics Steven Chu visited MIT to map out his strategies to restore U.S. competitiveness in clean energy in a talk at Kresge Auditorium this Wednesday. This is his first visit to the Institute since his Compton lecture in 2009. The event was sponsored by the student-run MIT Energy Club.

In his address — “Winning the Clean Energy Race” — Chu made extensive use of historical examples of



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**U.S. Secretary of Energy Steven Chu gave a talk about clean energy** Wednesday in Kresge Auditorium.

“transformative technologies,” ranging from the discovery of the Haber-Bosch process (synthesis of ammonia) to the development of vacuum tubes and transistors, as analogies to what he believed were the right policies for growth in the U.S. economy.

Using the talk as an opportunity to reach out to the MIT community, Chu also announced the Better Buildings Challenge. Part of President Obama’s Better Buildings Initiative, the Challenge calls on company CEOs, university presidents, and state and local leaders to build more energy-efficient and money-saving buildings, and recognizes them for their efforts. “Part of the Challenge is a ‘case competition’ to encourage energy club students to come up with solutions to these energy efficiency barriers,” said Chu.

According the Department of Energy’s website, the Better Building Case Competition allows college students to work on real scenarios submitted by both public- and private-sector DOE partners through a team formed by their university’s energy club. The teams will be invited to present at a

Steven Chu, Page 7

## MIT hosts White House manufacturing conference

Government officials and regional leaders in industry and academia gathered at MIT on Monday for a day-long forum as part of a White House initiative that aims to turn America’s laboratory advances into new technologies to boost

the U.S. economy. The meeting was part of the Advanced Manufacturing Partnership (AMP), created by President Obama in June as a national effort to bring to-

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## Construction, Destruction by Big Pharma



KAILANG CHEN—THE TECH

**Top — The Analog Devices building, located between Smart and Osborne Street, was torn down** to make way for a new building for Novartis AG. The Swiss pharmaceutical giant has plans to double the size of its facilities in Cambridge.

**Bottom, foreground — Construction begins on a new Pfizer building** at 610 Main Street. Pfizer, also a pharmaceutical company, is moving research to Cambridge and has signed a 10-year lease for the MIT-owned property. What remains of the Analog Devices building can be seen in the background.

### IN SHORT

**Online pre-registration** for IAP and Spring began on Thursday at 9 a.m. If you haven’t registered yet, don’t forget!

**IS&T will be updating Exchange from the 2007 to 2010 edition.** Check your email to see if this update affects you.

**Balfour will be here** Monday through Thursday to handle Brass Rat business.

**Stem cell court briefs are due on Jan. 12** for James Sherley’s appeal to stop the NIH from funding human embryonic stem cell research. The NIH’s brief is due Feb. 27, and Sherley’s reply on March 12.

**Send news information and tips to** [news@tech.mit.edu](mailto:news@tech.mit.edu).



## Skyward Sword is here!



Read our review  
on [page 8](#)

## News Briefs

### Economy Hardware

Economy Hardware in Central Square has reopened after nearly a year of renovation. The store, which underwent reconstruction last December, was set to open in the spring but was initially delayed until October and finally opened today. Economy Hardware has been in Cambridge for over 60 years, store owner Larry Friedman told *The Tech* in January. Some of their original space is now being used by Cambridge Community Television. They are located at 438 Mass. Ave. and also have locations in Boston and Brookline.

### Swartz arraigned

Aaron H. Swartz, the former Harvard Ethics fellow who was arrested in August for downloading 4.8 million JSTOR documents via MIT’s network with

the intent to upload them to file-sharing sites, was arraigned in Middlesex Superior Court on Wednesday. He plead not guilty.

Swartz has been charged with breaking and entering with intent to commit a felony, unauthorized access to a computer data network, and larceny for over \$250. The Middlesex Superior Court clerk has also ordered Swartz to surrender his passport.

JSTOR is an electronic archive of academic journals. Swartz is alleged to have hidden a laptop in the 16-004t network closet and plugged it into the network there, running “keepgrabbing.py” and “keepgrabbing2.py.”

According to an agreement between the defense and pros-

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### CONGRESS SUCKS

With its hipster-named supercommittees, non-negotiable negotiations, and polarization, how can Congress work? **OPINION, p. 4**

### DON'T TRUST THE MAINSTREAM

Check out the new Cold War flick Tinker, Tailor, Soldier, Spy. **ARTS, p. 10**

### WINTER IS COMING

Survival tips and tricks for the weatherly challenged. **CAMPUS LIFE, p. 11**



### THE AIRBORNE TOXIC EVENT

Takes Orpheum Theater by storm with their instrumental antics. **ARTS, p. 10**

### ENGINEERING A WINNING STREAK

Men’s basketball now 5-0 after annihilating Emerson. **SPORTS, p. 16**

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# European Central Bank head suggests wider rescue is possible, pending spending discipline

By Jack Ewing  
THE NEW YORK TIMES

FRANKFURT, Germany — Mario Draghi, the president of the European Central Bank, laid the groundwork for a more aggressive response to the debt crisis Thursday, suggesting that the bank could increase its support for the European economy if political leaders took more radical steps to enforce spending discipline among members.

In the run-up to a meeting of European leaders late next week, Draghi's remarks seemed to be part of a larger effort by the ECB and the region's biggest economic powers — Germany and France — to lay the foundation for a broader rescue without seeming to compromise their principles.

Later Thursday, the French president, Nicolas Sarkozy — acknowledging the region's debt crisis — announced that he and the German chancellor, Angela Merkel, would meet in Paris on Monday "to make French-German propositions to guarantee

the future of Europe."

Last weekend, Germany and France began floating a plan to hold member nations of the euro currency union more financially accountable to their fellow members by giving European Union officials the power to vet and approve their national budgets. Eurozone agreement to such a proposal is seen as a possible precondition to increased financing by the ECB, to which Germany and France are the biggest contributors.

Draghi, in the manner of central bankers, made no explicit promises Thursday. And the quid pro quo he offered governments was indirect. But his remarks illuminated how the ECB might answer increasingly desperate calls for the bank to escalate its intervention in bond markets without violating its own mandate or alienating Germany, where opposition to an ECB bailout of Greece or Italy continues to run deep.

Speaking to the European Parliament in Brussels, Draghi stopped well short of offering a

European version of the sort of large securities purchases that the Federal Reserve has used to try stimulating the U.S. economy.

But he seemed to be saying that the ECB would use its virtually unlimited financial resources to keep financial markets at bay, if government leaders in the euro region agreed to do their part by addressing the structural flaws that allowed the debt problems of Greece to mutate into a threat to the global economy.

"What I believe our economic and monetary union needs is a new fiscal compact," Draghi said. "It is time to adapt the euro area design with a set of institutions, rules and processes that is commensurate with the requirements of monetary union."

After government leaders take steps to improve the way the euro area is managed, "other elements might follow," Draghi said.

European leaders will hold a summit meeting Dec. 9, which is now seen as the latest deadline — there have been many during the nearly two-year euro debt saga —

for stemming the crisis.

Europe appeared to have bought a bit more time Wednesday, when the Federal Reserve, the ECB and four other central banks agreed to free up more dollar lending to European banks. But the stock market rally that followed that move did not carry over to Thursday — although successful government bond auctions in Spain and France did indicate at least a temporary calm in the debt storm.

By insisting that greater action would depend on rules to enforce spending discipline among euro members, Draghi might at least partly address German concerns that greater ECB action would reward countries that have mismanaged their finances and violate a prohibition against financing governments.

"Mr. Draghi appeared to be holding up the possibility of a greater degree of ECB intervention if euro area governments were to commit, at next week's key EU summit, to a tougher set of fiscal rules," analysts at Barclays

Capital said in a research note.

After insisting for weeks that the ECB is not authorized, under the European Union treaty, to bail out national governments, Draghi on Thursday hinted at how the treaty mandate might nonetheless let the central bank to do just that. He noted that the ECB's mandate required it to ensure price stability "in either direction."

Typically, the ECB has seen its main job as keeping a lid on inflation. But "either direction" might mean that if inflation fell below the central bank's official target of about two percent, the ECB would be required to take action to prevent deflation. That would be justification for the central bank to do what so many experts have been urging: buy government bonds on the open market in greater amounts. That would effectively ease the debt crisis for those governments, while also stimulating the eurozone economy by pumping hundreds of billions of euros into it — printing money, as economists call it.

## Chinese manufacturing contracts in November

HONG KONG — The Chinese manufacturing sector contracted in November, according to a closely watched barometer, indicating that a key engine of global growth is getting dragged down by the economic woes of Europe and the United States and by the Chinese authorities' moves to cool inflation.

An index measuring activity in the manufacturing sector, released by the China Federation of Logistics and Purchasing on Thursday, slumped to 49 in November, much more than economists had expected. The reading, below the 50 mark that separates expansion from contraction, marked a significant fall from the previous month's reading of 50.4.

A separate purchasing managers' index released by HSBC on Thursday painted a similar picture. That index fell to 47.7, from 51 in October.

—Bettina Wassener,  
The New York Times

## Job losses for many; good new jobs for few

People across the working spectrum suffered job losses in recent years: bricklayers and bookkeepers as well as workers in manufacturing and marketing.

But only a select few workers have fully regained their footing during the agonizingly slow recovery.

Even though the Labor Department is expected to report Friday that employers added more than 100,000 jobs in November, a new study shows just how rare such people are. According to the study, to be released Friday by the John J. Heldrich Center for Workforce Development at Rutgers, just seven percent of those who lost jobs after the financial crisis have returned to or exceeded their previous financial position and maintained their lifestyles.

The vast majority say they have diminished lifestyles, and about 15 percent say the reduction in their incomes has been drastic and will probably be permanent.

—Motoko Rich,  
The New York Times

On the occasion of the visit of the President of the Austrian Federal Economic Chamber, Christoph Leitl to MIT you are cordially invited to join us for a lecture followed by a buffet reception.

- What: **A model for the future of the European Union (followed by a buffet reception)**
- Who: **Dr. Christoph Leitl, President of the Austrian Economic Chamber**
- Where: **MIT Sloan School of Management / Room E62-250**
- When: **December 8<sup>th</sup> 2011 at 5:30 pm**
- RSVP: **by December 6<sup>th</sup> to [Stephanie.artner@advantageaustria.org](mailto:Stephanie.artner@advantageaustria.org) OR Tel: (212)421-5250**

A severe sovereign debt crisis and the obvious inability to enact suitable controls and sanctions shape the debate about the future of Europe. As an entrepreneur and a longtime leader and voice of the European business community Christoph Leitl strongly believes that Europe needs not only a new policy focus but a different approach to integration. Together with Günther Verheugen the former EU Commissioner for Enterprise and Industry he recently published an English/German anthology ("Europe? Europe!") where he likens the Union with a complacent company resisting the need for innovation and prescribes some remedies.

**Christoph Leitl** was elected President of the Austrian Federal Economic Chamber in 2000 and reelected in 2005 and 2010. From 2002 till 2005 Leitl served as President of EUROCHAMBRES, the Association of European Chambers of Commerce and Industry. As current honorary President of EUROCHAMBRES, Leitl focuses on the internationalization of European businesses and the creation of a global chamber platform.

Best regards  
Christian Kesberg  
The Austrian Trade Commissioner for the USA



Austrian Trade Commission  
120 West 45th Street, 9th Floor  
New York, NY 10036  
United States of America

Tel +1 212 421 52 50  
Fax +1 212 421 52 51  
[newyork@advantageaustria.org](mailto:newyork@advantageaustria.org)  
[www.advantageaustria.org/us](http://www.advantageaustria.org/us)



# EU tightens sanctions against Iran after embassy attack

By Nicholas Kulish  
and Rick Gladstone  
*THE NEW YORK TIMES*

BERLIN — The European Union announced tightened sanctions against Iran on Thursday in the aftermath of the storming of Britain’s Tehran embassy, adding 180 Iranian officials and companies to a blacklist that freezes their assets and bans travel to member states.

But the measures fell well short of demands by Britain and France for an embargo on oil purchases from Iran, one of the world’s leading producers. Greece, a European Union member and a significant buyer of Iranian oil, expressed strong resistance to that step, and China, one of Iran’s biggest customers for oil, warned the Europeans against what it called “emotionally charged actions” to punish Iran in response to the British embassy attack.

The developments at a European Union ministerial meeting in Brussels came as new details emerged regarding the scale of destruction at the British embassy

and a British diplomatic residential facility in Tehran on Tuesday by Iranian protesters — apparently aligned with the government-controlled Basij militia — angry over the West’s economic sanctions against Iran over its disputed nuclear weapons program.

Reuters reported from Tehran that Western diplomats who had toured the British facilities 24 hours after the assault reported “devastating” damage and that the ambassador’s personal residence had been “systematically destroyed.”

Britain’s government withdrew its diplomats from Iran on Wednesday, ordered Iran to close its embassy in London and gave Iranian diplomats a 48-hour deadline to vacate Britain, officially downgrading relations with Iran to the lowest possible, short of a formal break.

British leaders also accused Iran’s Islamic hierarchy of approving the assault on the British diplomatic facilities in Tehran, which evoked images of the Iranian takeover of the U.S. Embassy there more than 30 years ago. At least

four other European countries have closed their Tehran embassies since Tuesday as a precaution.

According to a statement released by the Council of the European Union, the foreign ministers meeting in Brussels said the tightened sanctions “target entities and individuals directly involved in Iran’s nuclear activities, which are in violation of U.N. Security Council resolutions.” The statement also said the ministers would look at additional ways in coming weeks to broaden existing sanctions aimed at Iran’s financial system, transport sector, energy sector and the Revolutionary Guard, a segment of the Iran armed forces that Western nations suspect is the overseer of a clandestine nuclear weapons program.

The group of foreign ministers also condemned the attack on the British diplomatic facilities in Tehran, saying that the council “considers these actions taken against the U.K. as actions against the European Union as a whole. The EU is taking appropriate measures in response.”

## Egypt’s Muslim brotherhood keeps distance from Salafis

CAIRO — The Muslim Brotherhood’s political arm Thursday distanced itself from a more conservative Islamist party as early vote tallies indicated that the two factions would claim the two largest roles in the first Parliament elected since the ouster of President Hosni Mubarak.

Responding to reports that the two Islamist parties could together make up a majority of the new Parliament, the Brotherhood’s Freedom and Justice Party denied that there was any “alleged alliance” with the ultraconservative party, Al Nour, to form “an Islamist government.”

The statement appeared to be aimed at quieting the anxiety of Egyptian liberals and Western governments about the unexpectedly large share of the vote apparently won by Al Nour, which was formed by the ultraconservative Islamists known as Salafis. It also reflected the fine line that the Muslim Brotherhood is walking as it tries to hold together its most ardent Islamist supporters in the streets without provoking a backlash at home or internationally.

—David D. Kirkpatrick, *The New York Times*

## UN official says Syria is in a civil war

BEIRUT — The United Nations declared Thursday that Syria was in a state of civil war, as the death toll from nearly nine months of bloodshed rose to more than 4,000 people and more soldiers were reported to have defected from the army to join an armed uprising against President Bashar Assad.

The comments by the U.N. high commissioner for human rights, Navi Pillay, came as the Local Coordination Committees, an opposition group, said security forces killed at least 24 people across the country Thursday.

“We are placing the figure at 4,000, but the information coming to us is that it’s much more,” Pillay said at a news conference in Geneva. “As soon as there were more and more defectors threatening to take up arms, I said this in August before the Security Council, that there’s going to be a civil war. And at the moment that’s how I am characterizing this.”

Her declaration came amid rising international pressure on Assad’s government, with the Arab League, the European Union, Turkey and the United States all taking measures to further constrict the Syrian economy. In past months, the Syrian pound has faltered, and the country’s two major sources of revenue — tourism and oil — have been crippled by sanctions.

—Nada Bakri, *The New York Times*

# After Clinton visit, US to relax some curbs on aid to Myanmar

By Steven Lee Myers  
*THE NEW YORK TIMES*

YANGON, Myanmar — Secretary of State Hillary Rodham Clinton said Thursday that the United States would loosen some restrictions on international financial assistance and development programs in Myanmar, in response to a nascent political and economic opening in the country.

The U.S. and Myanmar, formerly known as Burma, also agreed to discuss upgrading diplomatic relations — which were suspended for two decades — and exchanging ambassadors, a step that could transform U.S. diplomacy in Southeast Asia.

Clinton met the country’s new president, U Thein Sein, Thursday morning and its main opposition leader, the Nobel peace laureate Aung San Suu Kyi, later in the day, underscoring the Obama administration’s cautious efforts to nurture a

thaw in one of the world’s most isolated and repressive nations. In each meeting, Clinton delivered a letter from President Obama expressing support for the democratization of Myanmar.

“For decades, the choices of this country’s leaders kept it apart from the global economy and the community of nations,” Clinton said after meeting Thein Sein in Naypyidaw, Myanmar’s remote new capital. “Today the United States is prepared to respond to reforms with measured steps to lessen its isolation and improve the lives of citizens.”

Clinton met Thein Sein at the monumental presidential palace, erected along with the rest of the city only six years ago on what had been an obscure stretch of farmland about 200 miles north of Yangon, the country’s largest city. Thein Sein, a former general and prime minister in the previous military government, greeted Clinton cordially, calling her

visit as “a historic milestone” that he hoped would “open a new chapter in relations.”

Where that new chapter will lead depends on whether Thein Sein’s government takes additional steps to open up the country’s politics, release political prisoners and end the violent repression of minority ethnic groups in some of the world’s longest civil conflicts.

A senior Obama administration official said late in the day Thursday that there was not yet any specific timetable for actions by either country and that a full restoration of diplomatic relations appeared to be months away, at a minimum.

In her meetings and public statements, Clinton said she raised a number of issues that have divided the U.S. and Myanmar since 1990, when the ruling military junta refused to acknowledge the results of elections won by Suu Kyi’s party, the National League for Democracy.

## Official says US needs time to assess aid to North Korea

SEOUL, South Korea — The United States needs more time to decide on possible aid for North Korea because it is not sure humanitarian assistance would reach the people in need, the top U.S. aid official said Thursday.

Rajiv Shah, the head of the United States Agency for International Development, made the comment amid growing appeals from U.S. and United Nations relief agencies, which have recently called for urgent aid for the most vulnerable of the North Korean population, especially its children.

“Our goal is to identify and complete an assessment of whether food aid assistance can effectively be provided in a manner that is transparent and targeted and reaches intended beneficiaries and avoids the risk of graft and misappropriation,” Shah said in an interview.

In recent weeks, Mercy Corps and four other U.S. relief organizations operating in North Korea have charged that by delaying a decision on aid, Washington was playing politics with humanitarian aid for children.

—Choe Sang-Hun, *The New York Times*

### WEATHER

## Seasonal temperatures for now, but warming up

By Roman Kowch  
*STAFF METEOROLOGIST*

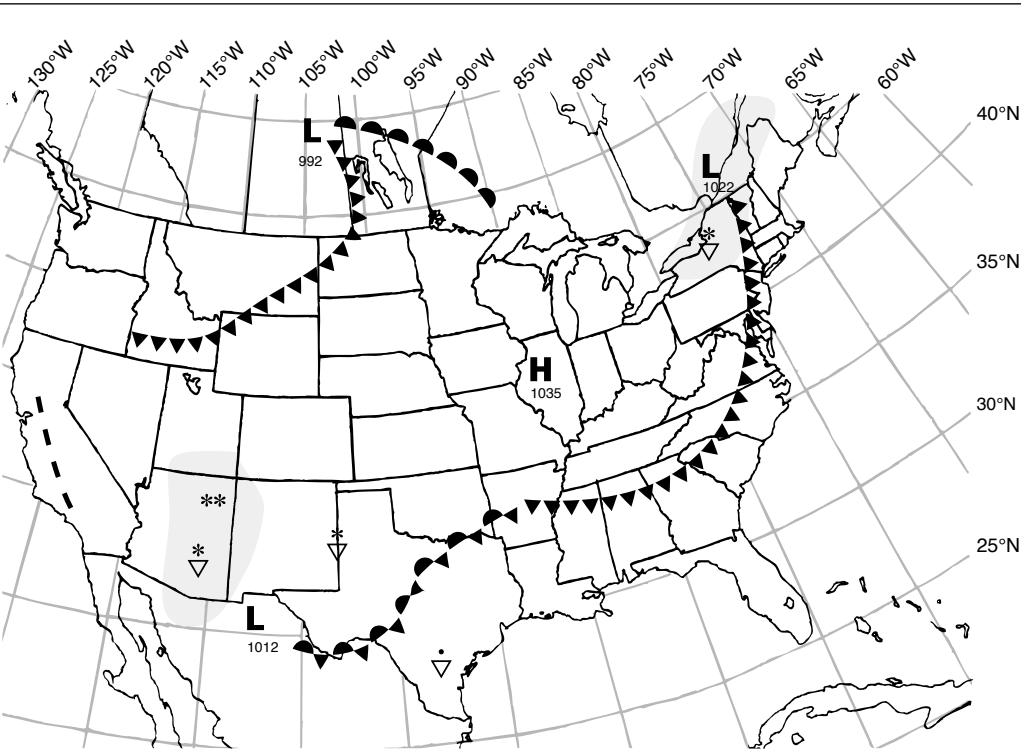
Earlier this week, New England experienced above normal temperatures. Highs have been in the mid to upper 60s (18–20°C) with generally clear weather (despite the quick 0.76” of rain at Logan Airport last Tuesday night). But today, cooler weather has arrived since winds have become northerly and are bringing air down from Canada. A high pressure just to our west will keep cool air blowing in

through Saturday.

By Sunday warm weather will make a return to New England as the high pressure moves into the Atlantic. Southwesterly winds will stream in warm air from the Gulf states, nearly replicating our weather from earlier this week. Temperatures will likely reach near 60°F (16°C) by Monday and Tuesday. Rain-free skies are expected from now until then, with winds ranging from 5–15 mph. (And not the recent 50–100 mph speeds blasting the desert Southwest!)

### Extended Forecast

**Today:** Partly cloudy. High 52°F (11°C). NW wind at 5–10 mph.  
**Tonight:** Becoming mostly clear. Low 32°F (0°C). N wind at 10 mph.  
**Tomorrow:** Sunny. High 45°F (7°C). N wind at 10 mph.  
**Sunday:** Mostly sunny. High 55°F (13°C).  
**Monday:** Increasing clouds. Highs in the low 60s (16–18°C), lows in the low 40s (4–7°C)



Situation for Noon Eastern Time, Friday, December 2, 2011

Weather Systems	Weather Fronts	Precipitation Symbols		Other Symbols
		Snow	Rain	
<b>H</b> High Pressure	- - - Trough	☄	☂	☁ Fog
<b>L</b> Low Pressure	⌒ Warm Front	☂	☂	⚡ Thunderstorm
☄ Hurricane	⚡ Cold Front	☂	☂	☁ Haze
	⌒ Stationary Front	☂	☂	
		☂	☂	



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# Congress needs to get its act together

*Legislative process is mired in antipathy and frustration*

Lost hopes and broken dreams: these seem to be the recurring themes with Congress nowadays. I'm sure most of you remember what happened back in August with the federal budget; if not, here's a brief recap.

The United States government needs money in order to provide the many services that its citizens rely on. Thanks to us, the taxpayers, it's able to fund its day-to-day operations and services, which include maintaining the public transportation systems, funding the many departments of the federal government, and keeping Social Security alive and well. The aggregate income that the federal government has is called, predictably, the annual federal income.

Now comes the fun part: spending all the hard-earned money. The combined annual federal spending and expenditures that include, but aren't limited to, the aforementioned public services are called annual federal spending. Seeing as this is MIT, let's do a little math. If annual federal income is greater than annual federal spending, we have what is called a surplus, which means that not all of the money collected on taxes got spent by the federal government, easing the following year's budget concerns. Unfortunately, we haven't had a federal surplus since President Clinton held office. Instead, the situation since President George W. Bush has been the reverse, meaning that the federal government has been spending more money than it was collecting on taxes. This is called a deficit.

So how does Joe Sixpack pay for something when he doesn't have enough cash in his pocket? He pulls out his trusty (insert brand name here) credit card and charges the balance to the old Platinum. In essence, that is exactly what the federal government did for the duration of the last decade: they borrowed money to pay off the deficit and accumulated debt. The problem with using a credit card, however, is that if Joe uses it too often, he'll eventually hit his card spending limit and will no longer be able

to use it until he pays off his balance, or at least the card minimum. If the unthinkable happens and Joe doesn't pay up when his balance is due, he defaults on his debt and gets his credit rating slashed by the three rating agencies. In this instance, Joe finds himself in a difficult situation, where he neither has the sufficient funds to purchase anything nor can he borrow from the bank. Sadly, this is also exactly what happened this past summer when the federal government reached its borrowing limit, known as the debt ceiling. Unable to borrow and short of cash, the federal government came uncomfortably close to defaulting on its debt, something that has never happened in U.S. history.

**If these people can't sit down and agree to anything because of their political ideologies and useless dogmas, why are they even there?**

With hours to spare, Congress came up with a brilliant plan that would increase the debt ceiling and get rid of the deficit in about a decade. However, they didn't take appropriate measures to quickly reduce the deficit and settle the situation then and there. Instead, they came up with an ingenious plan to create yet another useless joint subcommittee within Congress and gave it a very hipster name, the Joint Super-committee on Deficit Reduction. This Super-committee, comprised of 12 members of Congress (six Democrats and six Republicans), was charged with figuring out how to reduce the federal deficit by more than a trillion dollars. Failure to do so would result in automatic spending cuts of about \$1.2 trillion, with the largest budget cuts being made in the Department of Defense, education, housing, and others.

Now, I don't want to judge, but I really think that the American public is onto something, what with Congress's eight per-

cent approval rating. If these people can't sit down and agree to anything because of their political ideologies and useless dogmas, why are they even there? What's the use of opposing views if they never come together in a meaningful way? I really want to know if the members of Congress actually think of themselves as good negotiators, because if they do, let me define the word negotiation: "mutual discussion and arrangement of the terms of an agreement." Saying that you don't want any taxes or that spending cuts are nonnegotiable is not negotiating. Just like Europe, America has to take difficult but significant austerity measures to reduce its huge federal deficit.

It's important to understand that a polarized Congress will always have a very hard time coming up with any meaningful decisions. It's therefore very important that the members of Congress be competent, knowledgeable, open to dialogue, and willing to negotiate. If any readers would like to see firsthand how frustrating a polarized Congress truly is, they are cordially invited to attend the simulation of Congress that will take place on Monday, Dec. 5 from 7 p.m. to 9 p.m. in 3-370. This experiment will be conducted as a part of 17.20 (Intro: American Political Process). In this simulation, students will take up the roles of Congressional figures, interest groups, and notable executives to try to pass legislation. By sitting in on the simulations, attendees will experience how truly convoluted, annoying, and frustrating the legislative process can get.

**Saying that you don't want any taxes or that spending cuts are nonnegotiable is not negotiating.**

“There are three goals that I hope our 1720 American government simulation will accomplish: First, I want students to experience how politics and policies come together as part of the American political process. The simulation is designed to serve as a lab in which students can experience firsthand the many challenges and opportunities involved in this process. Second, I want students to apply some of the theoretical political science material they have learned over the course of the semester to some real-life issues facing American politics today. Third, since this is a CI-H class, I want students to get a strong foundation not only in effective written communication, but also in persuasive oral communication, both one-on-one and in a large group setting. Politics is messy and complicated, but it also can be incredibly rewarding and inspiring. I hope that our class simulation will make that evident in a way that no textbook or scholarly work can,” said Carlos E. Diaz-Rosillo, the 1720 professor.

I truly hope that Congress will get its act together soon and start making the hard choices that this country desperately needs. If not, we can always look forward to the elections next year.



An arts review published Tuesday incorrectly said that The Postelles and The Kooks performed at Paradise Rock Club on Nov. 19. The bands played at Boston's House of Blues.

## OPINION POLICY

**Editorials** are the official opinion of *The Tech*. They are written by the Editorial Board, which consists of Chairman Joseph Maurer, Editor in Chief Ethan A. Solomon, Managing Editor Connor Kirschbaum, Executive Editor Aislyn Schalck, and Opinion Editors Nina Sinatra and Ryan Normandin.

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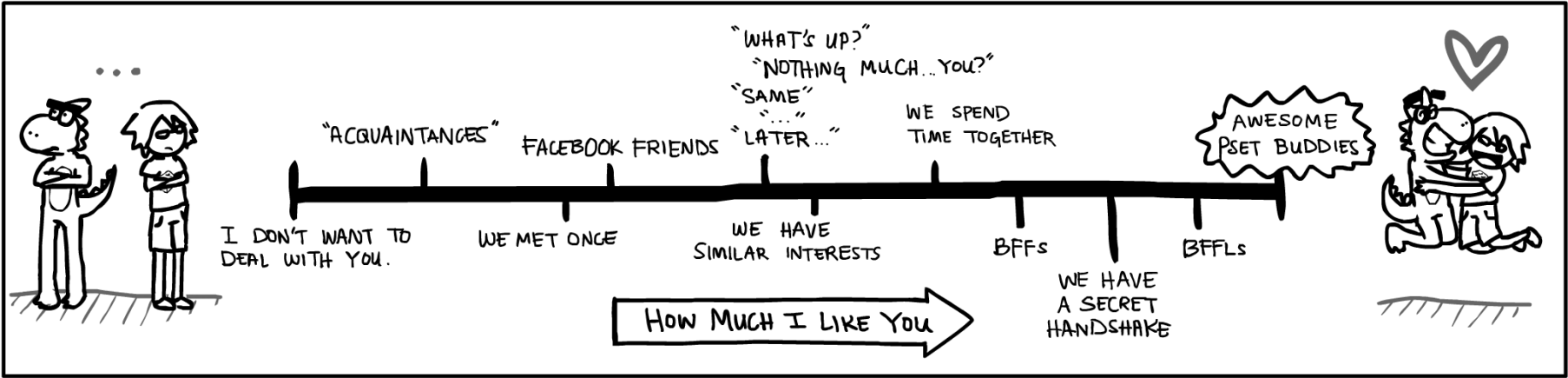
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Arthursaurus Rex by Ramya Swamy



Sudoku

Solution, page 14

4	3	9		2		7		
		5	1	9				
8		1						
	7	3	9					8
			8	7	6			
6					2	1	4	
						8		3
				5	1	2		
		7		8		4	6	5

Techdoku

Solution, page 14

18+					12x		
30x					3		
22+				15x	1-		
	6x				240x		
2		6x					
24x					30x		

Crossword Puzzle

Solution, page 13

ACROSS

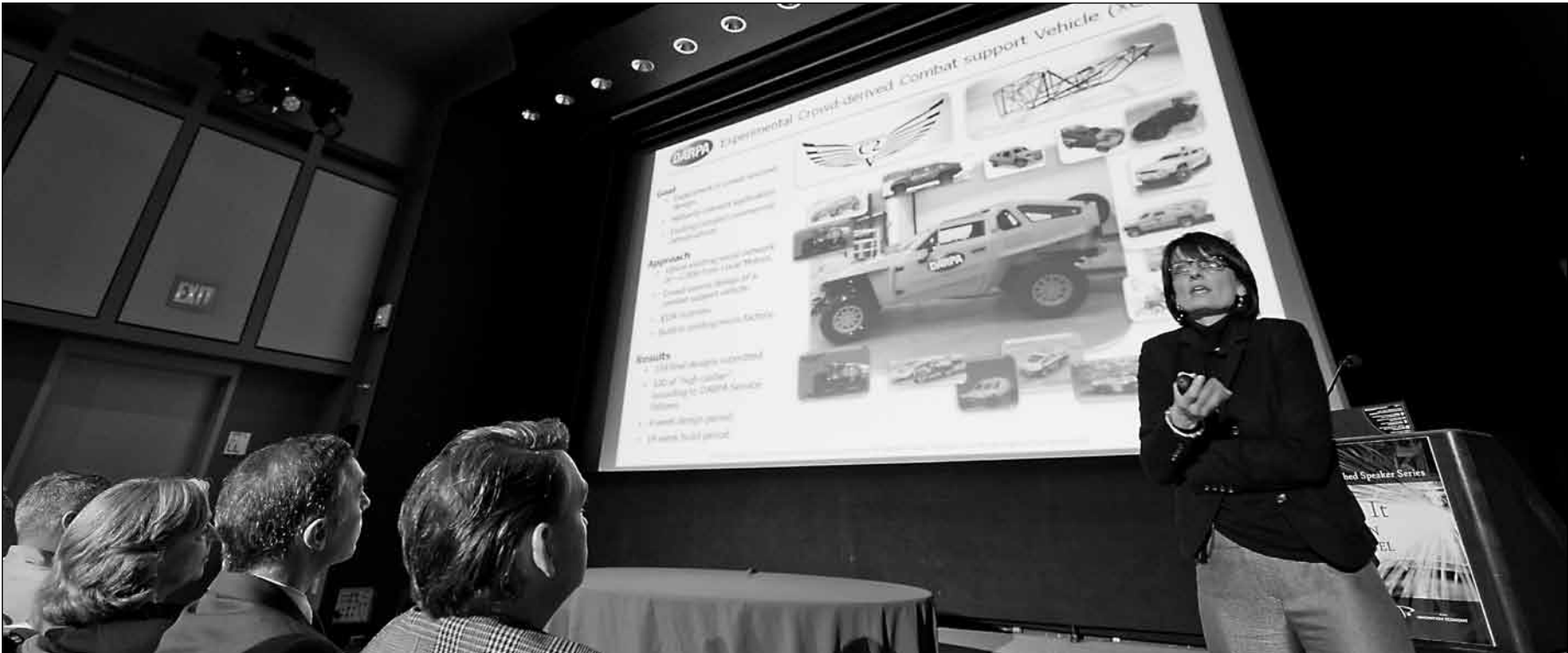
- 1 Roofed passageway
- 7 Ghost costume feature
- 15 Noblemen like Macbeth
- 16 Holy smoke!
- 17 Valiant
- 18 Carves
- 19 Usurer
- 21 Lifeless
- 22 Horror film street
- 23 Became stiff
- 25 Medicinal quantity
- 26 Drove a nail obliquely
- 28 Suitors
- 30 Ready or \_\_\_\_
- 31 Ice house
- 33 Sainted founder of Scholasticism
- 35 Of the gall bladder
- 37 Casino employee
- 41 One and one, side-by-side
- 45 Photographer Arbus
- 46 Qty.
- 49 \_\_ of the guard
- 51 Stocking shade

DOWN

- 1 Like Olympics competitors
- 2 Study of matter flow and deformation
- 3 Sweet chewy candies
- 4 Unknown auth.
- 5 Believer in God
- 6 Shun
- 7 "Self-Reliance" author
- 8 Bronx nine
- 9 Part of the U.K.
- 10 Last name in spydom
- 11 Man who played Chan

- 12 Continue to exist
- 13 Greatly
- 14 Sonnet part
- 20 Small Celebes buffalo
- 24 Scot of a famous case
- 27 Overplay the TLC
- 29 Sliding ride
- 32 Unctuous
- 34 Primary
- 36 Soccer pair?
- 38 City on Lake Geneva
- 39 Imperil
- 40 Types in data, again
- 42 Record of an expense
- 43 Female ruler
- 44 Scruff
- 46 Laughably foolish
- 47 Bearing
- 48 Medicinal lozenge
- 50 Katmandu language
- 53 Gaucho's devices
- 55 Plunged downward
- 58 Sleep restlessly
- 60 Bluish green
- 62 Definite article

1	2	3	4	5	6		7	8	9	10	11	12
15							16					
17							18					
19						20				21		
22				23					24		25	
26			27		28				29		30	
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52			53		54					55		56
57				58		59					60	
61					62				63			
64									65			
66									67			



CHRISTOPHER A. MAYNOR—THE TECH

**Regina Dugan, Director of the Defense Advanced Research Projects Agency (DARPA)**, was invited to discuss manufacturing for the defense industry on Tuesday as a part of MIT's Political Science Distinguished Speaker Series. Also present at the event was Kaigham J. Gabriel ScD '83, Deputy Director of DARPA.

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Swartz defense and gov't.  
prosecution agree on ground rules

Swartz, from Page 1

ecution, Swartz will not have access to his five hard drives and the millions of JSTOR items contained on them for the purposes of preparing a defense, but he and his counsel will be able to review forensic copies of the data at the Secret Service's Boston office.

Swartz and his team will also be permitted to read — but not keep — several email

threads about weaknesses in MIT and JSTOR's network. He can also examine police reports containing the name of a student who identified him from a photo spread, along with a witness who has been "charged but not convicted in state court in a matter arising out of a personal relationship," said the agreement. Swartz will be in court again on Jan. 3 for a pretrial conference.

—Jessica J. Pourian

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Undergraduate science, mathematics, engineering, and computer science students are invited to apply for summer research positions at the MIT Haystack Observatory in Westford, MA. Research projects include radio astronomical studies, atmospheric physics investigations, and hardware and software development for data acquisition and processing. The program extends from June 4 to August 10, 2012 and carries a weekly stipend of \$500.00. Women, minorities and students with disabilities are encouraged to apply. For further information and application materials, see <http://www.haystack.mit.edu/edu/reu/>.

Application deadline is 1 February 2012

# Chu cites historical cases

## *But reserved towards expanding nuclear, gas*

Steven Chu, from Page 1

workshop organized by the DOE, which will “provide students with valuable networking time with DOE leadership and potential future employers, as well as fellow student colleagues.” The winners will be recognized “with superlative awards,” and their proposals will be made available on the DOE website.

During the talk, Chu stressed that “federal support is critical to technology leadership.” He gave the example of the advent of airplanes, which started with Samuel Langley and the Wright brothers. Even though Langley, funded by the government, designed a failed prototype while the Wright brothers succeeded without any government support, Chu said that it was ultimately the efforts of federal government that lead to the advancement of the U.S. aviation industry. Chu cited the U.S. military continuing bulk purchase of aircraft and the Kelly Air Mail Act — which allowed private companies to carry U.S mail — as the reason that U.S. was able to restore leadership in airplane production after losing to Europe for much of the early 20th century.

When it came to the U.S. clean energy industry, Chu drew parallel between the rise of the automobile industry and the solar industry. He said the Chinese company Suntech, the current largest producer of solar modules in the world, is “Henry Fording” the U.S.; Henry Ford dominated auto manufacturing even though Daimler and Benz in Germany invented automobiles. Similarly, even though solar technology was invented in the U.S., Suntech imports its silicon materials from the U.S. and now produces most of the highest-quality photovoltaics in the world in China. “It was high-tech manufacturing, quality production that dominated the market,” said Chu.

Chu recently came under fire for his support for a guaranteed \$528 million in federal loans to the solar power company Solyndra, which is now bankrupt. He had defended his decision earlier this month by saying that the collapse in solar panel prices, which was partly responsible for Solyndra’s default, was unexpected by most analysts when his department went forward with the loans.

Chu said horse excrement may be responsible for spurring innovation in the U.S. Automobile technology was able to rapidly transform the U.S. economy, he said, despite requiring substantial infrastructure improvements — a change motivated in part due to the environmental pollution of horse manure and horse urine from horse-powered vehicles. “In New York and Brooklyn in 1880, there were 160,000 horses producing three to four million pounds of horse manure a day,” Chu said. Today, environmental concerns like global climate change can be a driving force for clean energy development in the U.S., he added.

Professor Ernest J. Moniz moderated a Q&A session following the talk, in which the Energy Secretary answered four questions.

In response to a question submitted by John M. Hagerty G on the future of nuclear energy in the U.S., Chu said he believed that nuclear has a place in electricity generation in the U.S., but he would like to see it continue at the level of 20–25 percent of the total domestic energy production. “Going into the next century, I was actually hoping we can just transition away from it, to be 80 percent renewable as well as having energy storage in the transmission system,” said Chu.

Hagerty later said in an email to *The Tech* that Chu seemed reluctant about nuclear energy, “especially with Moniz pushing him on the possibilities for small modular nuclear reactors, which Chu seemed to be aware of the potential upsides for those reactors but not willing to endorse.”

Caleb J. Waugh G, co-president of the MIT Energy Club, also submitted a question to Chu asking his opinion on the rise of the shale gas industry.

“We think we’ll keep the price of gas moderated for at least 10 or 20 years,” he responded. While recognizing that gas is a good, cleaner alternative to coal, Chu still hopes the industry will eventually decline. Chu acknowledged that the competition from gas is an issue to the nuclear and renewable energy industry, but believed that the price of gas won’t stay cheap indefinitely, while the costs of renewable energy are still going down.

“50 years from today, I believe solar will be very inexpensive,” he said.

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**<https://sloanbid.mit.edu>**

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#### Institute-wide bidding for Sloan (Course 15) subjects\*:

Opens 9:00 a.m., Thursday, December 22

Closes 5:00 p.m., Thursday, December 29

#### Waitlist Round for closed Sloan (Course 15) subjects:

Opens 9:00 a.m., Thursday, January 5

Closes 5:00 p.m., Thursday, January 12

#### Section Swap Round for changing sections of pre-enrolled Sloan (Course 15) subjects:

Opens 9:00 a.m., Wednesday, January 18

Closes 5:00 p.m., Wednesday, January 25

Please contact Scott Alessandro, [salissan@mit.edu](mailto:salissan@mit.edu), if you have questions regarding Sloan (Course 15) Course Bidding.

**Successful bids will appear on your Spring Registration and will be posted on the bidding website as of January 5<sup>th</sup> -- write down your password to check results!**

*\*For 15.031J, 15.037J, 15.053, 15.058, 15.279, 15.301, 15.501, 15.516, 15.628, 15.668, 15.812, and 15.S42 you can sign up directly through WebSIS starting December 1<sup>st</sup>. It is not necessary to bid for these courses.*



VIDEO GAME REVIEW

# Zelda fans, rejoice

Skyward Sword boasts an improved level design, new graphics, and an engaging storyline

By Jessica J. Pourian  
STAFF WRITER

*Skyward Sword* might just be the best Zelda game ever made.

The *Legend of Zelda: Skyward Sword* was released last Sunday to great critical acclaim. It is the fastest selling Zelda game of all time — since its release last week it has sold over 535,000 copies in the U.S. alone. The game comes five years after its predecessor, *The Legend of Zelda: Twilight Princess*, which launched with the Wii console in 2006. It's been a long wait for devout Zelda fans, and it's been worth it. I spent many, many hours over about five days completing this game, and I can't wait until Christmas break to do it all again.

Gameplay-wise, *Skyward Sword* is phenomenal. You can be engrossed from one to twelve hours depending on your commitment, and the new save point system makes it easy to stop and start playing: instead of saving any time and being reset to a default location when you boot up the game, you now save at specific statues, and you are spawned there when you begin again.

*Skyward Sword* mixes it up from previous Zelda games, adding a diversity of neces-

sary tasks to complete the game — it's not just about dungeon-hopping anymore. The worlds themselves are fully utilized, and the journeys to get to the dungeons can sometimes be just as challenging and time consuming as the dungeons themselves. You'll have to return to the same areas multiple times throughout the game, but the experience is kept fresh with a variety of twists and environmental changes that can be rather difficult to overcome. There are also plenty of humorous side-quests to keep you occupied when you don't feel like focusing on the lengthy main quest. Skyloft, the main overworld from which you access every other region in the game, is a safe place to wander and hunt for treasure. It's much like the ocean in *Wind Waker*, but flying around using the Wiimote is much more fun than sailing.

While using the Wiimote as a sword and for other activities is mostly fun and intuitive, the most obvious problems in the game stem from the sometimes-annoying controls. The constant use of motion control can be tedious. Swimming, which is controlled by motions of the Wiimote, can be very frustrating. It's easy to overshoot the direction you want, and if you move the Wiimote too far to one side it sometimes launches you in a different direction.

Nintendo has also done away with the three item/three button assignment that's been the norm for Zelda games since *Ocarina of Time*. Now, a real-time item selection screen is permanently on B. Hit B quickly to equip your

current item, and hold it down to view the item screen. This is the single worst part of the game — you can find yourself mid battle staring at the item selection screen while enemies pummel you or, better yet, you'll suddenly be fighting a boss holding your bug net.

But besides swimming and item selection, the game is nearly perfect. The 1:1 sword control introduced in this game is what Wii users have been waiting for since the console's release five years ago. The fighting can initially be challenging — if you are not careful, you might find yourself waggling your Wiimote to no avail. Enemies are designed to take advantage of poor swordplay, and you must aim your strikes with precision if you want to win. Once you get over the learning curve, however, it becomes quite satisfying to strategically slash at enemies. Bosses are especially focused on keeping you aware of your motions, and each win becomes more rewarding.

Also adding a new strategic element to the game is the stamina gauge — a meter that allows Link to dash for a short time. The meter also drains with sword spin moves, making battles somewhat tougher.

The dungeons themselves, which spotlight several new, unique designs, are some of the best I have seen in an adventure game. They showcase a variety of different puzzles that will keep you on your toes and, departing from typical Zelda fashion, you won't have to light a single torch to complete the game. *Skyward Sword* forces you to compile techniques you learn throughout the game — you can't just rely on one item anymore

and must instead creatively use many of your items to get through a level. The bosses are cleverly designed and provide many epic showdowns throughout the game.

The graphics are absolutely gorgeous. When the "watercolor" approach was initially announced, I was hesitant we were going to see a departure from the realism of *Twilight Princess* for a more cel-shaded, *Wind Waker*-type feel. I was wrong. Though the graphics are more cartoon-y than some other games, these watercolor graphics are an excellent fit for the Zelda series. The characters remain realistically proportioned, but the animation allows for fantastical creatures like Gorons and other races to still look smooth and in place. Backgrounds in the game are cleverly blurred with an impressionistic effect, both compensating for the Wii's lack of processing power and providing a lovely backdrop for each world.

Keeping with past Zelda games, Nintendo has paid close attention to the music in *Skyward Sword*. Dramatic scenes are scored with fully orchestrated music, and you'll be whistling the main theme of the game long after you finish it. Though music isn't as heavily emphasized in *Skyward Sword* as it was in *Ocarina of Time*, the game is still an aural pleasure. Fans of the series' music should consider purchasing the special edition of the game, which comes bundled with an orchestrated soundtrack of Zelda's most memorable themes and a gold Wiimote Plus featuring the Hylian Crest.

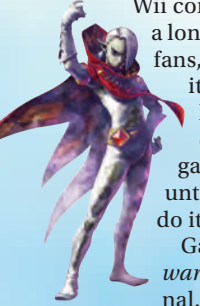
What really makes this game shine

above its predecessors is the excellent storytelling. Nintendo has pinned down its characters better than it ever has before.

This 40+ hour game is well worth your time. With excellent graphics, a beautifully crafted storyline, and intriguing level design, you won't find a better adventure game out there this holiday season. It is a solid candidate for the best Zelda game ever created; even better than, dare I say it, *Ocarina of Time*. It is a stronger game in nearly every way, though I admit *OoT*'s nostalgia give it a serious edge with most college-age gamers. Even if you think *Ocarina of Time* is the pinnacle of all gaming, you should put down your p-sets and pick up your Wiimote-swords to try out Nintendo's newest Zelda — you might be pleasantly surprised.

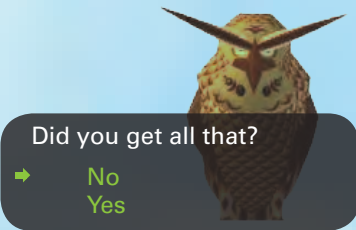
choice is the right one, as it allows the game to progress smoothly, and no jarring voices interrupt your playing experience.

*Skyward Sword* had me more invested in a video game than any other game in a long time. I felt my pulse quicken at boss battles and I truly came to like all the characters. The ending, along with a few choice cut-scenes throughout the game, had me in tears. I won't spoil anything for you, but I will tell you that



The 1:1 sword control introduced in this game is what Wii users have been waiting for since the console's release five years ago.

The characters are far more expressive than they have been in any prior Zelda game, and even NPCs who don't matter to the central storyline will charm you with their personality and humor.



Did you get all that?  
No  
Yes



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# Smiley, Smiley, where's your smile?

**By Angelique Nehmzow**  
*STAFF WRITER*

Unexpected, moving, and memorable scenes like this punctuate the atmospheric gray fabric of *Tinker, Tailor, Soldier, Spy*. Set in the Cold War era, the film is about uncovering the identity of a double agent in the British secret intelligence service, MI6. It is directed by a Swede, Tomas Alfredson, and is an adaptation of the eponymous spy-thriller novel by John Le Carré. It stars some



COURTESY OF FOCUS FEATURES; PHOTO BY JACK ENGLISH

The plot unfolds amidst smoking, tea drinking, rooftop rendezvous, and chilly morning swims. There is a sense of understated drama, with hints at hidden, shadowy subplots. The director maintains this, even as he intersperses the general solemnity with moments of poignant tenderness, sudden violence, and the introduction of colorful characters such as the ruffian Rick Tarr (Tom Hardy) and the racy Connie Sachs (Kathy Burke). He also provides light relief by showing a delightful attention to detail. For example, in one scene, the buzzing annoyance of a fly breaks the silence of a terse car drive; in another, the suggestive chopping of meat startles an anxious agent. There is even a scene in which an absurd Lenin Santa sings the Soviet National Anthem at an office Christmas party.

The protagonist, George Smiley (Oldman), is depicted as an austere and rather melancholic character, whose wife has left him and who has been removed from his position at MI6. He is brought out of this forced retirement to smoke a mole out of “the Circus,” and does so with the help of a levelheaded younger agent, Peter Guilam (Benedict Cumberbatch). By examining stolen documents and interviewing

# Tinker, Tailor, Soldier, Spy

**Directed by Tomas Alfredson**

**Starring Gary Oldman,  
Colin Firth and Tom Hardy**

## Rated R

## Now Playing

dismissed and discredited agents, Smiley unravels the treacherous scheme and identifies the “mole” from a list of suspects, who are code-named “tinker,” “tailor,” “soldier,” and “poorman,” in reference to a British children’s rhyme.

The first words uttered in this film are: "Trust no one. Especially not in the mainstream." If those in the mainstream do not rate this film highly, I would agree — don't trust them. Gripping story telling, a touch of humor, a strong cast, and creative cinematography make this a wonderful movie, and it's one you won't want to miss.

# Sad songs about girls and life

**By Maggie Liu**  
*STAFF WRITER*

Despite increased exposure, TATE remains largely unknown to the masses. While blasting TATE's "Something New" in my suite kitchen, a freshman burst into my suite. Gesturing excitedly to the music behind him he spluttered, "You like The Airborne Toxic Event too?! Wait, are they getting big now?" Assuring him that their fan base remained a modest size, I mused to myself that there was a kindred bond between TATE fans. In fact, this bond exists for followers of many American indie rock bands. While you want their music to be recognized and appreciated, you are also torn by the desire to protect them from the claws of mainstream media for fear of their style being altered to cater to mainstream tastes.

At the Orpheum Theater earlier this month, Mikel Jollett, the frontman, was both charismatic and exuberant. With a infectious boyish charm, Jollett made the concert a personal experience, introducing the band members with nicknames and epithets. There was no sense of pretension or formalism. Don't get me wrong — despite his roots as a freelance writer, Jollett is still very much the showman. A third of the way into the TATE concert, Jollett climbed from the stage to the box seats of the Orpheum and then proceeded to nimbly climb the railings. Half-giggling at his own antics and half-crooning out the lyrics, Jollett made sure the audience was enraptured with him as he tiptoed and swung from railing to railing.

In addition to Jollett, who showed himself to be a very colorful character, all of his bandmates were just as involved in the music as he was. Much clucking and cat-whistling ensued whenever the violinist and lone female member — Anna Bulbrook,

who hails from Boston — soloed. Steven Chen, their guitarist and sometimes-keyboardist, was the foil to Jollett's animated bubblyness. While Jollett would tease the audience and his band members, Chen would fend off Jollett's jovial jabs with the endearing seriousness of his guitar. The bassist Noah Harmon was almost as playful as Jollett, and their drummer Daren Taylor was head-bopping in the backdrop. The band was so lively and lovely, with much skipping and climbing onto equipment, that their live performance lent a whimsical air to their music. Almost all of them were constantly in motion. Many instrument swaps occurred, and the performance set really showed the breadth of instruments that went into TATE songs.

The performance hall did wonders for the more acoustic-heavy songs. "Innocence" was never a personal favorite, but the Orpheum Theater acoustics really highlighted the full-bodied notes of the upright bass, coupled with the echoes of the violin. Songs that featured just Jollett's breathy sighs and croons also reached a new dimension in the live performance; the broken whispers were especially haunting when amplified to an audience. Many of the songs played in the concert were old-time

favorites from their first album — “Something New,” “Sometime Around Midnight,” and the crowd favorite “Wishing Well.”

What really struck me about the TATE concert was the diversity of the audience. While I can wager that a portion of them were probably relatives and close friends of Anna Bullock, the Bostonian violinist, it was still astounding the spectrum of age groups. There was a strong contingency of suburban soccer moms and North Face-decked yuppies. Surprisingly the presence of beanie-capped, flannel-wearing hipsters was minimal, which I had assumed would be the majority of a hip LA band's fanbase.

Part of the reason that TATE's music can cater to a broad audience is the universality of their lyrics. They read like poetry, tapping into emotions and situations that many listeners can relate to. Take these lines from their song "Changing":

*And you tell me that you're scared that you're turning into your mother  
I feel myself turning into my father  
As we lie to each other like they do, and say we're so happy  
It's easy when you're young and you still want it so badly ....*

While the song itself describes the downward spiral of a young relationship and the struggles to salvage it, “Changing”

also alludes to other pressures of youth. Although their trademark songs are (in their words) "sad songs about girls," their new album has more self-reflection and also touches upon political topics. Most of the crowd-pleasers at the concert were the "sad songs about girls" from their eponymous first album. With not one, but two (or was it three?) encores, TATE showed as much affection for their audience as their audience did for them. Grinning, danc-



COURTESY OF AUTUMN DEWILDE

**The Airborne Toxic Event** played at the Orpheum Theater last weekend.







# Attention MIT Undergraduates!

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### Rolling around Lobby 7



BRUNO B. F. FAVIERO—THE TECH  
**An inflatable plastic ball — the Zorb — maneuvered by a person inside, rolled** around Lobby 7 Wednesday evening. Mechanical engineering professor Alex Slocum '82 said he brought out the Zorb, which was emblazoned with MIT's logo, for fun.

# MINOR IN HASS

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- |                               |                                  |
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| Literature                    |                                  |

[shass.mit.edu/undergraduate/mmj/minors](http://shass.mit.edu/undergraduate/mmj/minors)



# AMP’s second conference draws notable crowd

AMP, from Page 1

gether industry, universities, and the federal government to invest in new technologies that will “create high quality manufacturing jobs and enhance global competitiveness,” according to an MIT/White House press release. The AMP Steering Committee is co-chaired by President Susan J. Hockfield and Andrew Liveris, CEO of Dow

Chemical.

The AMP will deliver specific policy recommendations on manufacturing industries to the Obama administration next spring. The meeting was the second of four regional workshops with a similar aim — the first event was held Oct. 14 at the Georgia Institute of Technology, with the next two scheduled to be at the University of Michigan and the University of

California, Berkeley.

The event featured an array of 30 talks before an audience of several hundred people. Among those present were Massachusetts Governor Deval Patrick, Professor of Political Science Suzanne Berger, and Raymond S. Stata ’57, chairman of Analog Devices, the Cambridge-based semiconductor firm. The discussion involved finding ways to help manufacturing

ideas reach the market and keeping the manufacturing jobs that arise from new ideas in the United States. Patrick announced the creation of a new statewide group, the Advanced Manufacturing Collaborative, with similar goals to those of AMP.

“There are many in this nation who are convinced that nothing is made in America anymore,” Hockfield said in her opening remarks

at the event, according to the MIT News Office. “The truth is that manufacturing remains a key sector of our economy.”

MIT’s participation in the project, Hockfield noted, is in keeping with its long tradition; the Institute was founded 150 years ago, she said, with the “express purpose of accelerating America’s industrial progress.”

—Derek Chang

Solution to Crossword

from page 5

A	R	C	A	D	E		E	Y	E	H	O	L	E	S	
T	H	A	N	E	S		M	A	N	A	L	I	V	E	
H	E	R	O	I	C		E	N	G	R	A	V	E	S	
L	O	A	N	S	H	A	R	K		I	N	E	R	T	
E	L	M		T	E	N	S	E	D		D	O	S	E	
T	O	E	D		W	O	O	E	R	S		N	O	T	
I	G	L	O	O		A	N	S	E	L	M				
C	Y	S	T	I	C					D	E	A	L	E	R
				E	L	E	V	E	N		D	I	A	N	E
A	M	T		Y	E	O	M	A	N		N	U	D	E	
B	A	R	B		S	U	P	P	E	D		S	A	N	
S	N	O	O	T		C	R	E	P	I	T	A	N	T	
U	N	C	L	O	T	H	E			A	V	E	N	G	E
R	E	H	A	S	H	E	S			L	E	A	N	E	R
D	R	E	S	S	E	R	S			I	D	L	E	R	S

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Tribute Concert to the 10<sup>th</sup> Anniversary of 9/11

Gabriel Fauré: *Requiem*

Herbert Howells: *Take him earth for cherishing*

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CHRIS JONES *baritone*

Saturday, December 3 | 8pm

Kresge Auditorium

Free admission with MIT ID

# DNA sequencing bottlenecked in a deluge of data

By Andrew Pollack  
THE NEW YORK TIMES

BGI, based in China, is the world’s largest genomics research institute, with 167 DNA sequencers producing the equivalent of 2,000 human genomes a day.

BGI churns out so much data that it often cannot transmit its results to clients or collaborators over the Internet or other communications lines because that would take weeks. Instead, it sends computer disks containing the data via FedEx.

“It sounds like an analog solution in a digital age,” said Sifei He, the head of cloud computing for BGI, formerly known as the Beijing Genomics Institute.

But for now, he said, there is no better way.

The field of genomics is caught in a data deluge. DNA sequencing is becoming faster and cheaper at a pace far outstripping Moore’s law, which describes the rate at which computing gets faster and cheaper.

The result is that the ability to determine DNA sequences is starting to outrun the ability of

researchers to store, transmit and especially to analyze the data.

“Data handling is now the bottleneck,” said David Haussler, director of the Center for Biomolecular Science and Engineering at the University of California, Santa Cruz. “It costs more to analyze a genome than to sequence a genome.”

That could delay the day when DNA sequencing is routinely used in medicine. In only a year or two, the cost of determining a person’s complete DNA blueprint is expected to fall below \$1,000. But that

long-awaited threshold excludes the cost of making sense of that data, which is becoming a bigger part of the total cost as sequencing costs themselves decline.

“The real cost in the sequencing is more than just running the sequencing machine,” said Mark Gerstein, professor of biomedical informatics at Yale. “And now that is becoming more apparent.”

But the data challenges are also creating opportunities. There is demand for people trained in bioinformatics, the convergence of biology and computing. Numer-

ous bioinformatics companies, like SoftGenetics, DNASTar, DNAnexus and NextBio, have sprung up to offer software and services to help analyze the data. EMC, a maker of data storage equipment, has found life sciences a fertile market for products that handle large amounts of information. BGI is starting a journal, GigaScience, to publish data-heavy life science papers.

“We believe the field of bioinformatics for genetic analysis will be one of the biggest areas of disruptive innovation in life science tools over the next few years,” Isaac Ro, an analyst at Goldman Sachs, wrote in a recent report.

**MIT Gilbert & Sullivan Players present**

## The Sorcerer

**December 2, 3, 8, 9 - 8pm**  
**December 4, 10 - 2pm**

**La Sala de Puerto Rico, MIT Student Center**

**\$5 MIT students**  
**\$10 other students, children, seniors, MIT community**  
**\$15 general public**

**Thursday 12/8 performance is free for MIT students**

***web.mit.edu/gsp***

**Solution to Techdoku**  
*from page 5*

4	5	3	2	1	6
6	1	5	4	3	2
5	6	4	3	2	1
1	2	6	5	4	3
2	3	1	6	5	4
3	4	2	1	6	5

**Solution to Sudoku**  
*from page 5*

4	3	9	6	2	5	7	8	1
7	6	5	1	9	8	3	2	4
8	2	1	3	4	7	5	9	6
2	7	3	9	1	4	6	5	8
1	5	4	8	7	6	9	3	2
6	9	8	5	3	2	1	4	7
5	4	2	7	6	9	8	1	3
3	8	6	4	5	1	2	7	9
9	1	7	2	8	3	4	6	5

THE LOGARHYTHMS’  
**BRIGHT  
LIGHTS**  
LIKE YOU’VE NEVER  
SEEN THEM BEFORE  
IN KRESGE THIS FRIDAY





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## Siebel Scholars Class of 2012

The Siebel Scholars program recognizes the most talented graduate students in business, computer science, and bioengineering. Each year, 85 are named Siebel Scholars based on academic excellence and leadership, and join an active, lifelong community among an ever-growing group of leaders. We are pleased to recognize this year’s Siebel Scholars.

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